2016 Massachusetts HIV/AIDS Epidemiologic Profile

Detailed Data Tables: Groups most affected by HIV/AIDS

Recent changes to the presentation of Massachusetts HIV/AIDS surveillance data

Effective January 1, 2011, the Massachusetts Department of Public Health (MDPH), Bureau of Infectious Disease and Laboratory Sciences, HIV/AIDS fact sheets, epidemiologic reports and other HIV data presentations have been updated to remove all HIV/AIDS cases for all years presented that were first diagnosed in another state before being reported in Massachusetts. As of January 1, 2016, this resulted in the removal of 4,913 HIV/AIDS cases, of which 1,099 have died and 3,814 were living. These persons living with HIV infection may still continue to reside and receive care in the Commonwealth. The total number of persons living with HIV infection, regardless of location at diagnosis, is the basis for MDPH service planning. Please note that previous HIV/AIDS fact sheets, data reports and presentations included cases that may have been first diagnosed in another state.

Also effective January 1, 2011, the MDPH HIV/AIDS fact sheets, epidemiologic reports, and other data presentations have been updated to eliminate the presumed heterosexual risk category for men; those cases have been reassigned to the no identified risk (NIR) category. The presumed heterosexual risk category was used with the intention of identifying HIV risk for women when sex with men is the only reported risk factor, there is no evidence of current or past injection drug use (IDU), and behavioral risk and HIV status information about male sexual partners are unknown. The rationale for the application of the presumed heterosexual risk category to women only has been addressed in the MDPH Office of HIV/AIDS report "Intersecting Risks: HIV Infection among Heterosexual Women and Men in Massachusetts." (2010) http://www.mass.gov/Eeohhs2/docs/dph/aids/intersecting_risks.pdf. The CDC reports men diagnosed with HIV infection who report sex with women as their only risk factor, without corresponding partner risk or HIV status information, in the NIR category. This revision to report presumed heterosexual male HIV/AIDS cases as NIR will bring Massachusetts HIV/AIDS case reporting for men in alignment with CDC standards. The MDPH will maintain presumed heterosexual and heterosexual risk categories for women.

Explanation of Estimated Rates for Men who have sex with Men (MSM) and non-MSM[1]

Estimated MSM Prevalence Rate: An estimate of the proportion of MSM that were living with HIV infection. The numerator is the number of MSM (including MSM/IDU) who were living with HIV infection, ages 18 to 64, as of a specific date and the denominator is the estimated size of the MSM population. The size of the MSM population in Massachusetts was estimated by multiplying the average proportion of men, ages 18-64 years, reporting same-sex partner (or opposite and same-sex partner), on the 2013 and 2014 Massachusetts Behavioral Risk Factor Surveillance Survey (BRFSS) (6.4%), by the number of 18 to 64 year old men in Massachusetts as reported in the 2010 Census (2,064,804), to get 132,147. The prevalence rate in MSM is calculated by the formula:

HIV/AIDS prevalence rate for MSM as of 1/1/16	= (number of MSM living with HIV infection, ages 18-64, on 1/1/16÷ estimated population size of MSM)×100,000 = ((7,595/(.064×2,064,804))×100,000 = (7,595/132,147)×100,000 = 0.05747367×100,000 =**5,747.4 per 100,000**

Estimated non-MSM Prevalence Rate: An estimate of the proportion of non-MSM that were living with HIV infection used as a basis of comparison to the MSM prevalence rate. The numerator is the number of non-MSM, ages 18 to 64, who were living with HIV infection as of a specific date and the denominator is the estimated size of the non-MSM population. The size of the non-MSM population in Massachusetts was estimated by multiplying the average proportion of men, ages 18-64 years, reporting sex with only women, on the 2013 and 2014 Massachusetts BRFSS (93.6%) by the number of 18 to 64 year old men in Massachusetts as reported in the 2010 Census (2,064,804), to get 1,932,657. The prevalence rate in non-MSM is calculated by the formula:

HIV/AIDS prevalence rate for non-MSM as of 1/1/16	= (number of non-MSM living with HIV infection, ages 18-64 on 1/1/16÷ estimated population size of non-MSM)×100,000 = ((5,307/(.936×2,064,804))×100,000 = (5,307/1,932,657)×100,000 = 0.002745961×100,000 =**274.6 per 100,000**

Estimated Average Annual MSM HIV Diagnosis Rate: An estimate of the average proportion of MSM that were diagnosed with HIV infection over a three-year period. The numerator is the average number of MSM (including MSM/IDU) who were diagnosed with HIV infection over the three-year period and the denominator is the estimated size of the MSM population. The size of the MSM population in Massachusetts was estimated by multiplying the average proportion of men, ages 18-64 years, reporting same-sex partner (or opposite and same-sex partner), on the 2013 and 2014 Massachusetts BRFSS (6.4%), by the number of 18 to 64 year old men in Massachusetts as reported in the 2010 Census (2,064,804), to get 132,147. The estimated HIV diagnosis rate in MSM is calculated by the formula:

[1] Please see “Explanation of Rates” on page four for a general explanation of rates and age-adjustment

Average annual HIV diagnosis rate among MSM, 2012–2014	(((number of MSM diagnosed with HIV infection in 2012 + number of MSM diagnosed with HIV infection in 2013 + number of MSM diagnosed with HIV infection in 2014) ÷ 3) ÷ estimated population size of MSM) × 100,000 = ((959÷ 3)/(.064×2,064,804))×100,000 = (319.67/132,147)×100,000 = 0.002419015 ×100,000 =**241.9 per 100,000**

Estimated Average Annual non-MSM HIV Diagnosis Rate: An estimate of the average proportion of non-MSM that were diagnosed with HIV infection over a three-year period used as a basis of comparison to the MSM diagnosis rate. The numerator is the average number of non-MSM who were diagnosed with HIV infection over the three-year period and the denominator is the estimated size of the non-MSM population. The size of the non-MSM population in Massachusetts was estimated by multiplying the average proportion of men, ages 18-64 years, reporting sex with only women, on the 2013 and 2014 Massachusetts BRFSS (93.6%) by the number of 18 to 64 year old men in Massachusetts as reported in the 2010 Census (2,064,804), to get 1,932,657. The estimated HIV diagnosis rate in non-MSM is calculated by the formula:

Average annual HIV diagnosis rate among non-MSM, 2012–2014	(((number of non-MSM diagnosed with HIV infection in 2012 + number of non-MSM diagnosed with HIV infection in 2013 + number of non-MSM diagnosed with HIV infection in 2014) ÷ 3) ÷ estimated population size of non-MSM) × 100,000 = ((502÷ 3)/(.936×2,064,804))×100,000 = (167.333/1,932,657)×100,000 = 0.0000865820 ×100,000 **=8.7 per 100,000**

Explanation of rates

A “rate” of a disease per 100,000 population is a useful way to compare groups that have substantially different population sizes. For example, the number of people living with HIV infection on December 31, 2015 who are Hispanic/Latino, is 5,029 whereas the number of people living with HIV infection who are white (non-Hispanic) is 8,609. Although the number of people living with HIV infection who are Hispanic/Latino in Massachusetts is smaller than the number of people living with HIV infection who are white (non-Hispanic), there are fewer people of Hispanic/Latino ethnicity living in Massachusetts than white (non-Hispanic) individuals. Hispanic/Latino individuals represent 10% of the Massachusetts population compared to white (non-Hispanic) individuals who represent 78% of the population[2]. If HIV/AIDS had the same impact on the Hispanic/Latino population of the state as on the white (non-Hispanic), then there should be eight times as many cases in white (non-Hispanic) individuals, but there are less than twice as many. By calculating a rate, it is evident that the number of people living with HIV infection for every 100,000 Hispanic/Latino individuals in Massachusetts is much higher than the rate for every 100,000 white (non-Hispanic) individuals. This is calculated by dividing the number of people living with HIV infection by the population of interest (the total number of Hispanic/Latino individuals in Massachusetts, for example) and multiplying by 100,000. (See example 1.A below).

[2] The denominators for prevalence calculations are based on year 2010 population estimates from the MDPH Bureau of Health Information, Statistics, Research and Evaluation

Example 1.A: Calculation of crude HIV/AIDS prevalence rate for white (non-Hispanic) individuals, Massachusetts (167.7 per 100,000)

Crude HIV/AIDS prevalence rate for white (non-Hispanic) individuals	= (number of white (non-Hispanic) individuals living with HIV infection ÷ population size of white (non-Hispanic) individuals)×100,000 = (8,609/5,132,633)×100,000 = (.0016773)×100,000 = **167.7**

However, sometimes, in addition to the population size being different, the age composition of the populations is different. In Massachusetts, black (non-Hispanic) and Hispanic/Latino populations are generally younger than the white (non-Hispanic) population. The median age of black (non-Hispanic) people (29.7 years) and Hispanic/Latino people (24.5 years) is younger than that of white (non-Hispanic) people (38.8 years). Therefore, an appropriate comparison requires "age-adjustment" of the HIV/AIDS prevalence rate to get a true comparison of the impact of the disease across racial/ethnic groups without an effect from the differences in age composition. Age-adjustment of rates minimizes the distortion created by differences in age composition.

Age-adjusted rates are calculated by multiplying the age-specific rates for a given population by the age distribution of a standard population. The weighted age-specific rates are then added to produce the adjusted rate for all ages combined. (See example 1.B below).

Example 1.B: Calculation of age-adjusted HIV/AIDS prevalence rate for white (non-Hispanic) individuals, Massachusetts (140.3 per 100,000)

A	B	C	D	E
Age group (in years)	# of prevalent HIV/AIDS cases	Population (2010)	2000 US standard population weight	Age-adjusted rate ((B÷C×D)×100,000))
<1	0	48,010	0.013818	0.00
1-4	0	200,452	0.055317	0.00
5-14	5	571,967	0.145565	0.13
15-24	73	677,899	0.138646	1.49
25-34	536	603,245	0.135573	12.05
35-44	1042	676,064	0.162613	25.06
45-54	3100	841,315	0.134834	49.68
55-64	2884	697,852	0.087247	36.06
65-74	819	403,518	0.066037	13.40
75-84	138	275,380	0.044842	2.25
85+ years	12	136,931	0.015508	0.14
Total	**8,609**	5,132,633	1.000000	**140.3**

To see the effect of age-distribution on prevalence rates see Table 11 below for a comparison of crude and age-adjusted rates by race/ethnicity.

Table 1. Crude and age-adjusted HIV/AIDS prevalence rate per 100,000 population[1] on December 31, 2015 by race/ethnicity and sex at birth: Massachusetts[2]

State Total (N=20,272):	Crude rate per 100,000	Age-adjusted rate per 100,000
White, non-Hispanic	167.7	140.3
Black, non-Hispanic	1,464.4	1,512.2
Hispanic/Latino	801.2	1,059.4
Asian/Pacific Islander	110.9	114.0
Total prevalence	**309.6**	**278.4**
Men (N=14,439):	**Crude rate per 100,000**	**Age-adjusted rate per 100,000**
White, non-Hispanic	290.2	241.3
Black, non-Hispanic	1,688.6	1,811.2
Hispanic/Latino	1,117.8	1,562.5
Asian/Pacific Islander	181.9	187.3
Total prevalence among men	**456.0**	**408.5**
Women (N=5,833):	**Crude rate per 100,000**	**Age-adjusted rate per 100,000**
White, non-Hispanic	53.3	46.1
Black, non-Hispanic	1,254.9	1,268.7
Hispanic/Latina	496.0	631.5
Asian/Pacific Islander	45.8	47.4
Total prevalence among women	**172.5**	**158.3**

[1] The denominators for rate calculations are from the MDPH Massachusetts Race Allocated Census 2010 Estimates (MRACE 2010), Massachusetts Department of Public Health, Bureau of Health Information, Statistics, Research, and Evaluation

[2] Effective, January 1, 2011 the Massachusetts Department of Public Health, HIV/AIDS fact sheets, epidemiologic reports, and other data presentations have been updated to remove all HIV/AIDS cases for all years presented that were first diagnosed in another state before being reported in Massachusetts.

Data Source: MDPH HIV/AIDS Surveillance Program; Data are current as of 3/1/16 and may be subject to change

Table 2. Age-adjusted HIV/AIDS prevalence rate per 100,000 population[1] on December 31, 2014 by race/ethnicity and Health Service Region (HSR):[2] Massachusetts[3]

	Boston (N=6,379)	Central (N=1,708)	Metro West (N=2,999)	North-East (N=3,278)	South-East (N=2,803)	Western (N=2,191)	State Total (N=20,272)
White NH	616.6	82.0	99.6	112.3	121.6	90.8	140.3
Black NH	1,568.5	1,619.9	1,533.1	1,716.5	1,056.7	1,001.6	1,512.2
Hispanic/ Latino	1,156.9	923.7	706.0	744.4	1,116.1	1,283.6	1,059.4
API	185.1	106.9	59.1	152.7	101.7	141.2	114.0
Total	**864.4**	**177.8**	**175.6**	**227.5**	**190.6**	**243.9**	**278.4**

[1] The denominators for rate calculations are from the MDPH Massachusetts Race Allocated Census 2010 Estimates (MRACE 2010), Massachusetts Department of Public Health, Bureau of Health Information, Statistics, Research, and Evaluation; all rates are age-adjusted using the 2000 US standard population.
[2] Reflects the health service region of a person's residence at the time of report (not necessarily current residence); See Epidemiologic Profile General Appendices, Health Service Region Maps, available at http://www.mass.gov/dph/aids/research/profile2006/app5_hrs_maps.pdf for configuration of health service regions
[3] Effective, January 1, 2011 the Massachusetts Department of Public Health, HIV/AIDS fact sheets, epidemiologic reports, and other data presentations have been updated to remove all HIV/AIDS cases for all years presented that were first diagnosed in another state before being reported in Massachusetts.
[4] Rates calculated from numerators less than 5 for localities with populations of less than 50,000 are suppressed for the assurance of confidentiality.
NH = non-Hispanic, API = Asian/Pacific Islander
Data Source: MDPH HIV/AIDS Surveillance Program; Data are current as of 3/1/16 and may be subject to change

Table 3. Crude and age-adjusted rates of diagnosis of HIV infection per 100,000 population[1] by race/ethnicity and sex at birth: Average annual rate, Massachusetts[2], 2012–2014[3]

State total (N=2,027):	Crude rate per 100,000	Age-adjusted rate per 100,000
White (non-Hispanic)	4.8	4.8
Black (non-Hispanic)	49.2	48.5
Hispanic/Latino	30.8	31.3
Asian/Pacific Islander	6.7	5.7
Total rate	**10.3**	**10.3**
Men (N=1,510):	**Crude rate per 100,000**	**Age-adjusted rate per 100,000**
White (non-Hispanic) Men	8.7	8.6
Black (non-Hispanic) Men	57.2	57.3
Hispanic/Latino Men	48.1	48.5
Asian/Pacific Islander Men	11.4	9.7
Total rate among men	**15.9**	**15.6**
Women (N=517):	**Crude rate per 100,000**	**Age-adjusted rate per 100,000**
White (non-Hispanic) Women	1.2	1.2
Black (non-Hispanic) Women	41.8	40.9
Hispanic/Latina Women	14.1	15.2
Asian/Pacific Islander Women	2.3	2.1
Total rate among women	**5.1**	**5.1**

[1] The denominators for rate calculations are from the MDPH Massachusetts Race Allocated Census 2010 Estimates (MRACE 2010), Massachusetts Department of Public Health, Bureau of Health Information, Statistics, Research, and Evaluation

[2] Effective, January 1, 2011 the Massachusetts Department of Public Health, HIV/AIDS fact sheets, epidemiologic reports, and other data presentations have been updated to remove all HIV/AIDS cases for all years presented that were first diagnosed in another state before being reported in Massachusetts.

[3] Reflects year of HIV infection diagnosis among all individuals reported with HIV infection, with or without an AIDS diagnosis for the most recently available three-year period after the implementation of HIV infection reporting in 1999.

Data Source: MDPH HIV/AIDS Surveillance Program; Data are current as of 3/1/16 and may be subject to change

Table 4. Age-adjusted rate of HIV diagnosis per 100,000 population[1] by race/ethnicity and Health Service Region (HSR):[2] Average annual rate 2012–2014,[3] Massachusetts[4]

	Boston (N=606)	Central (N=146)	Metro West (N=310)	North-East (N=392)	South-East (N=307)	Western (N=241)	State Total (N=2,027)
White NH	14.4	2.6	3.5	5.1	4.5	3.9	4.8
Black NH	43.2	52.3	50.7	61.7	47.7	40.4	48.5
Hispanic/ Latino	40.7	15.2	21.0	26.7	40.6	34.5	31.3
API	9.8	6.2	3.8	6.0	6.1	4.5	5.7
Total	**24.3**	**5.9**	**6.7**	**10.2**	**8.3**	**9.8**	**10.3**

[1] The denominators for rate calculations are from the MDPH Massachusetts Race Allocated Census 2010 Estimates (MRACE 2010), Massachusetts Department of Public Health, Bureau of Health Information, Statistics, Research, and Evaluation; all rates are age-adjusted using the 2000 US standard population.
[2] Reflects the health service region of a person's residence at the time of report (not necessarily current residence); See Epidemiologic Profile General Appendices, Health Service Region Maps, available at http://www.mass.gov/dph/aids/research/profile2005/app5_hrs_maps.pdf for configuration of health service regions
[3] Reflects year of HIV infection diagnosis among all individuals reported with HIV infection, with or without an AIDS diagnosis for the most recently available three-year period after the implementation of HIV infection reporting in 1999.
[4] Effective, January 1, 2011 the Massachusetts Department of Public Health, HIV/AIDS fact sheets, epidemiologic reports, and other data presentations have been updated to remove all HIV/AIDS cases for all years presented that were first diagnosed in another state before being reported in Massachusetts.
NH = non-Hispanic, API = Asian/Pacific Islander
Data Source: MDPH HIV/AIDS Surveillance Program, Data are current as of 3/1/16 and may be subject to change

Table 5. Rate of HIV diagnosis per 100,000 population[1] by gender and age at HIV diagnosis: Massachusetts[2], 2012–2014[3]

Age (years):	Men (N=1,510)	Women (N=517)	Total (N=2,027)
Under 13	0.3	0.2	0.2
13 to 24	13.9	3.8	8.9
25 to 29	36.0	8.2	22.0
30 to 34	32.6	12.7	22.5
35 to 39	22.9	9.0	15.8
40 to 44	25.2	7.5	16.1
45 to 49	29.8	8.9	19.1
50 to 54	20.4	7.0	13.5
55 to 59	13.3	6.1	9.5
60+	4.5	1.9	3.1
Total	**15.9**	**5.1**	**10.3**

[1] The denominators for rate calculations are from the 2010 Census, SF1; rates are age-specific and not age-adjusted.
[2] Effective, January 1, 2011 the Massachusetts Department of Public Health, HIV/AIDS fact sheets, epidemiologic reports, and other data presentations have been updated to remove all HIV/AIDS cases for all years presented that were first diagnosed in another state before being reported in Massachusetts.
[3] Reflects year of HIV infection diagnosis among all individuals reported with HIV infection, with or without an AIDS diagnosis for the most recently available three-year period after the implementation of HIV infection reporting in 1999.
Data Source: MDPH HIV/AIDS Surveillance Program (percentages may not add up to 100% due to rounding); Data are current as of 3/1/16 and may be subject to change